

LISA DDPC

CARBON FOOTPRINT CALCULATOR

IRAP, TOULOUSE
20TH JUNE 2025

SOMMAIRE

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01

FOOTPRINT COMPUTING METHOD



RÉPUBLIQUE
FRANÇAISE

Liberté
Égalité
Fraternité



FOOTPRINT CALCULATOR INPUT DATA

FOOTPRINT COMPUTING
METHOD

Human Resources					Computer Equipment																		
Work		Travel		Tele-conference	Datacenter					Storage													
Time		Location		Transportation mean	Distance		Location		Length	Camera	Location		CPU.hours	CPU consumption	CPU manufacture	GPU.hours	GPU consumption	GPU manufacture	Datacenter	Data	Storage consumption	Storage manufacture	Datacenter

FOOTPRINT CALCULATOR EMISSION FACTORS DATABASES

FOOTPRINT COMPUTING
METHOD

- 3 emission factors databases
 - Countries mean electric mix
- Transportation means
 - Usage carbon intensity
 - Manufacture
 - End of life
- Datacenters
 - Specific electric mix
 - Power Usage Effectiveness
 - Location

02

APPLICATIONS

SUMMER WORKSHOP

COUNTRY REPRESENTATION

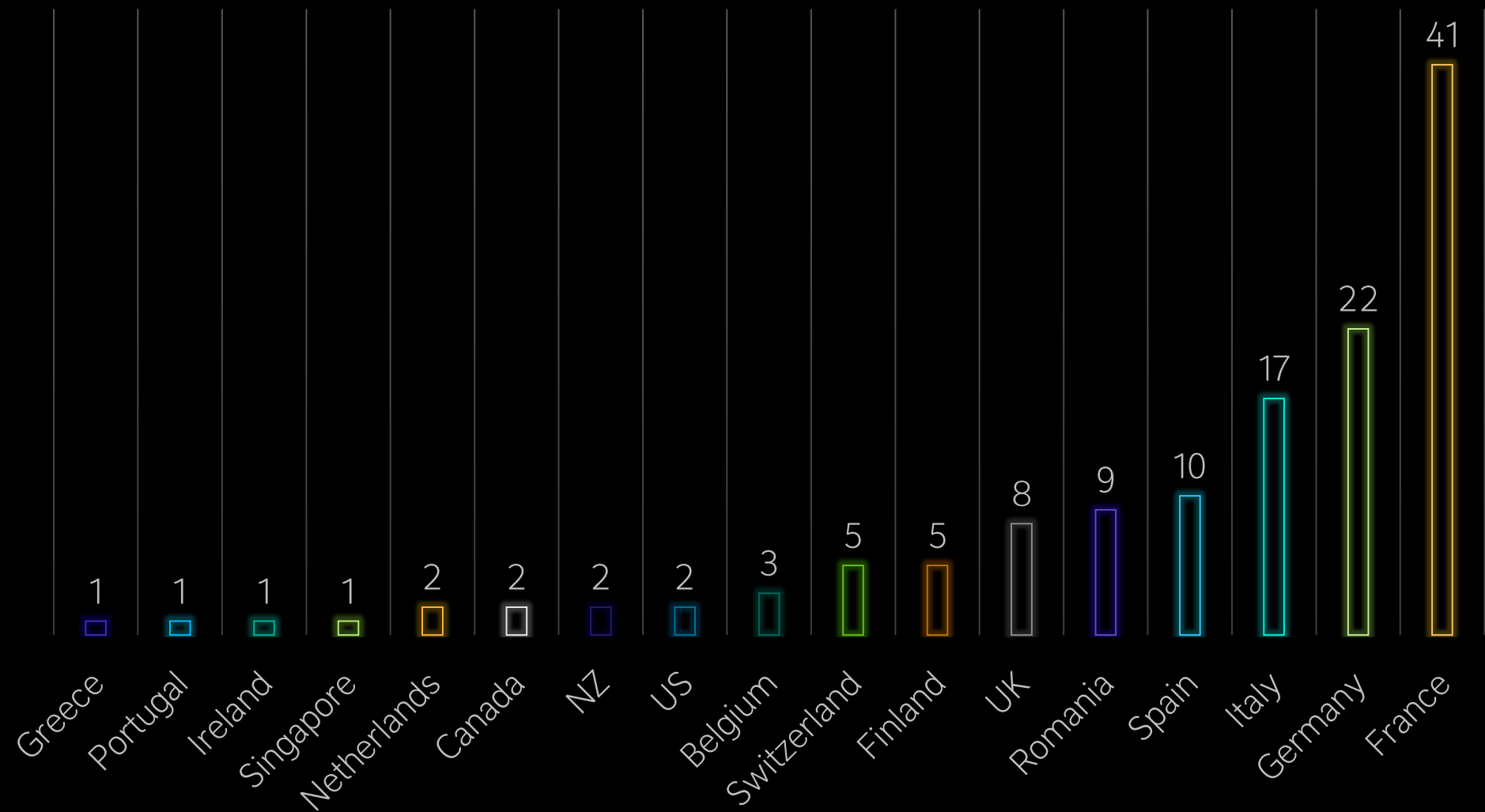
WORKSHOP STATISTICS

131

PEOPLE

17

COUNTRIES



WORKSHOP IN PARIS AS SINGLE HUB

WORKSHOP STATISTICS

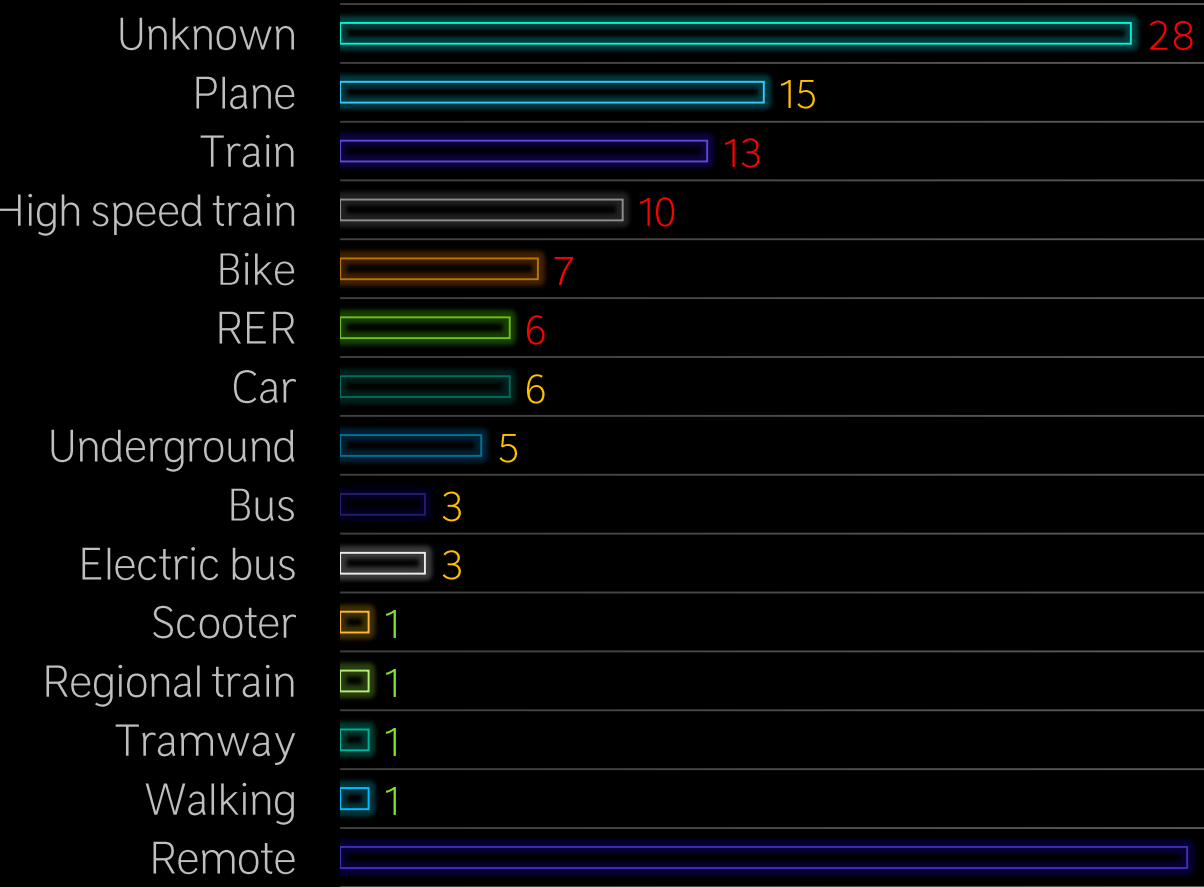
Hypotheses :

- Remote remains Remote
- Unknown remains unknown
- Paris hub remains identical
- Transportation means choice
 - According to distance travelled (one way)
 - Car < 500 km
 - 500 km < Train < 1000 km
 - Plane > 1000 km

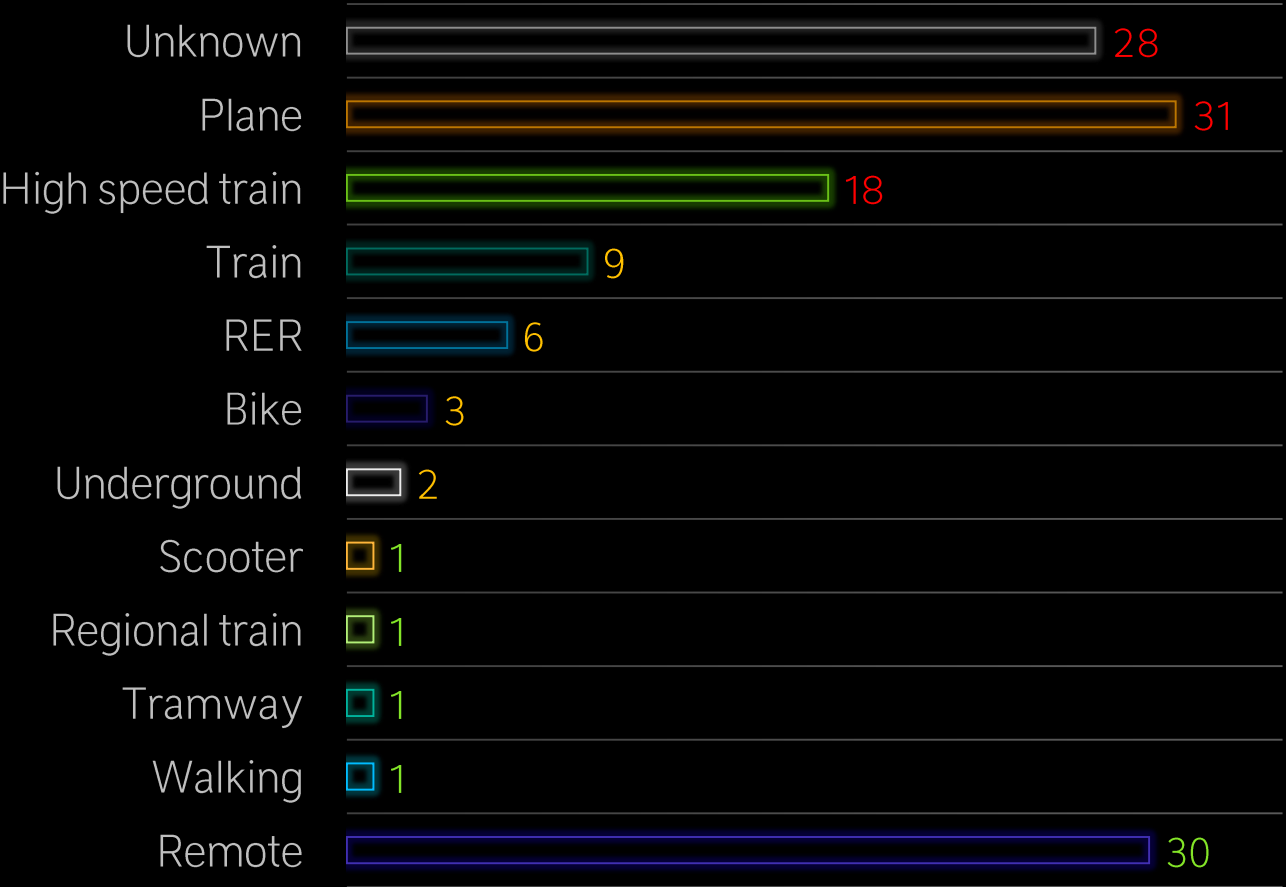
TRANSPORTATION MEANS

WORKSHOP STATISTICS

Multi-hub workshop



Single hub workshop



MULTIPLE HUBS VS SINGLE HUB

68%

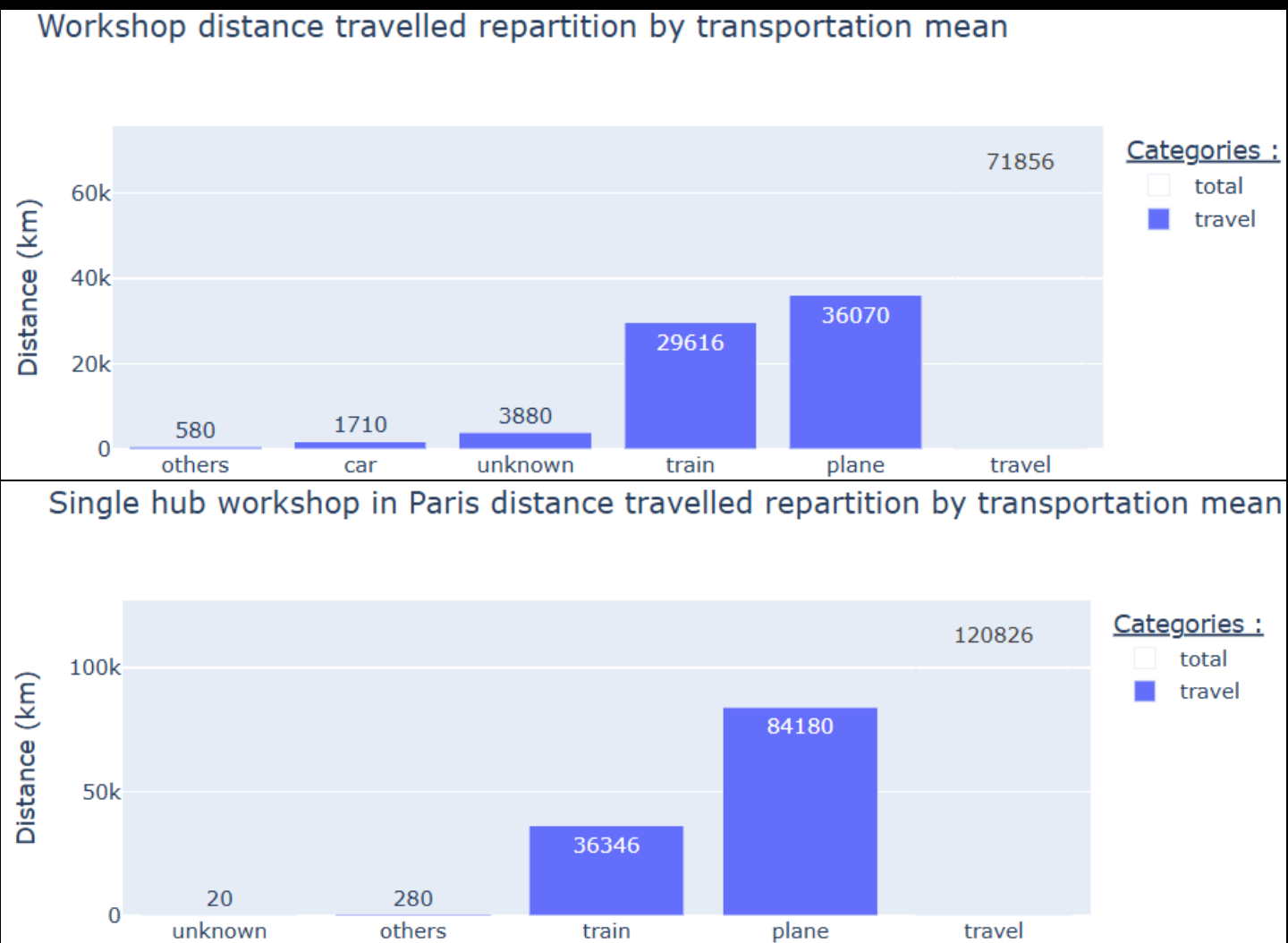
MORE DISTANCE TRAVELLED

23%

MORE TRAIN DISTANCE TRAVELLED

2.3x

MORE PLANE DISTANCE TRAVELLED



MULTIPLE HUBS VS SINGLE HUB FOOTPRINT

WORKSHOP FOOTPRINT

10.6 tCO₂e

MULTIPLE HUBS TOTAL FOOTPRINT

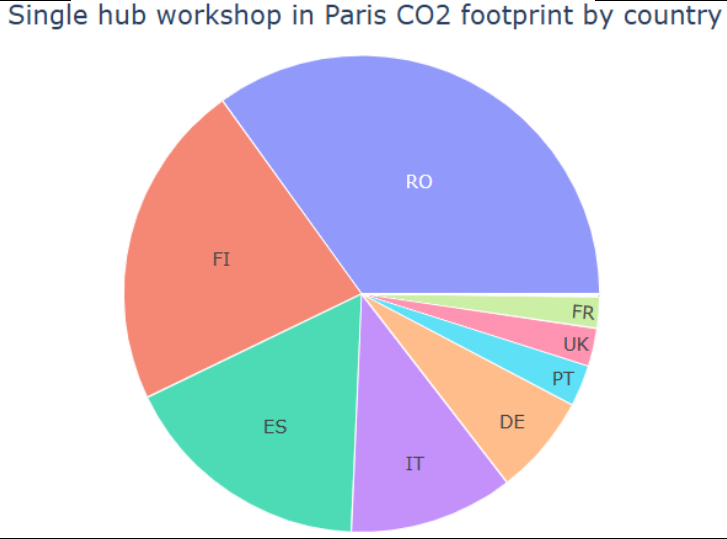
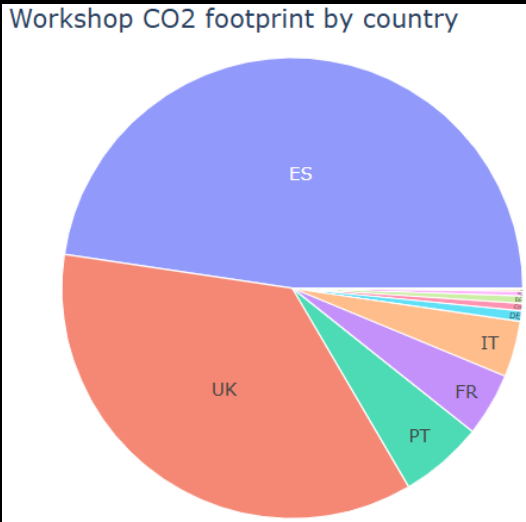
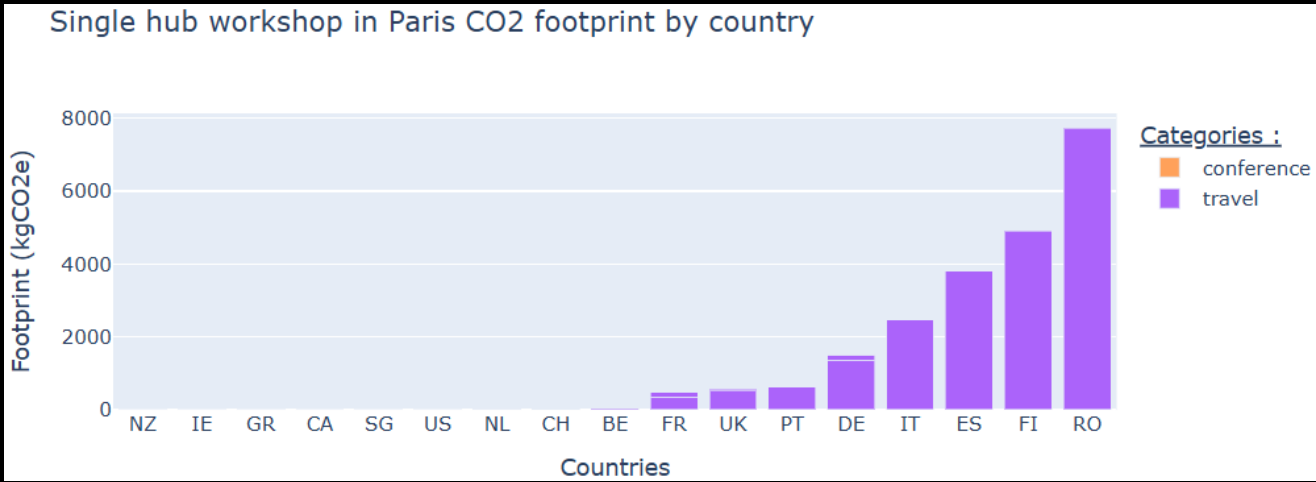
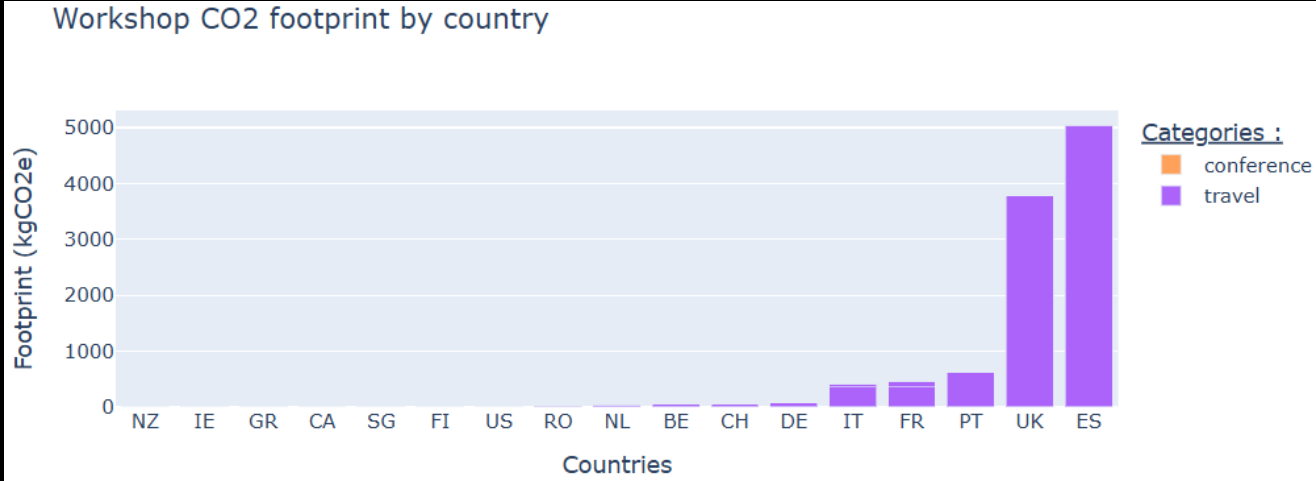
22.1 tCO₂e

SINGLE HUB TOTAL FOOTPRINT



MULTIPLE HUBS VS SINGLE HUB COUNTRY REPARTITION

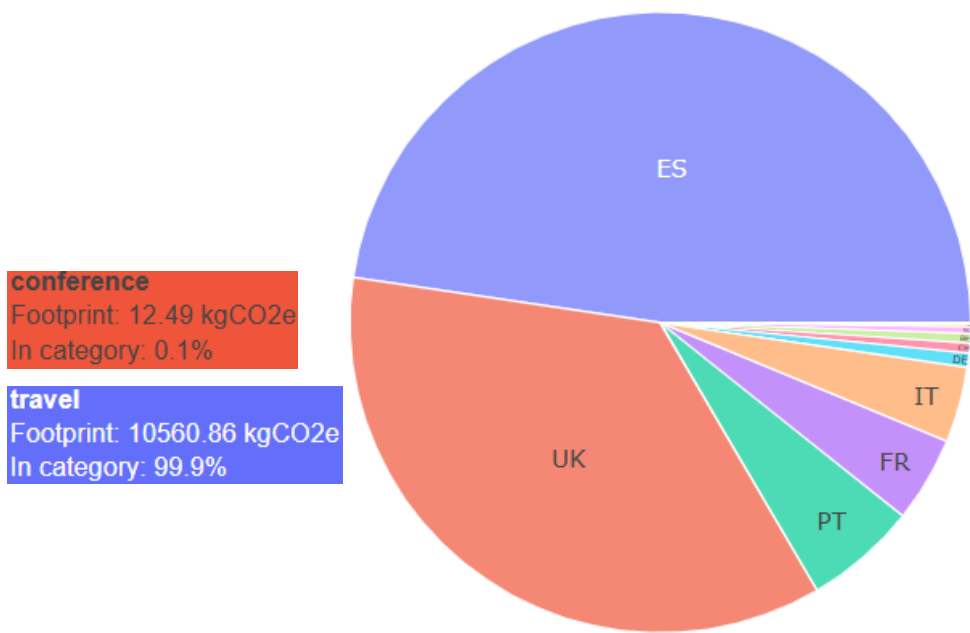
WORKSHOP FOOTPRINT



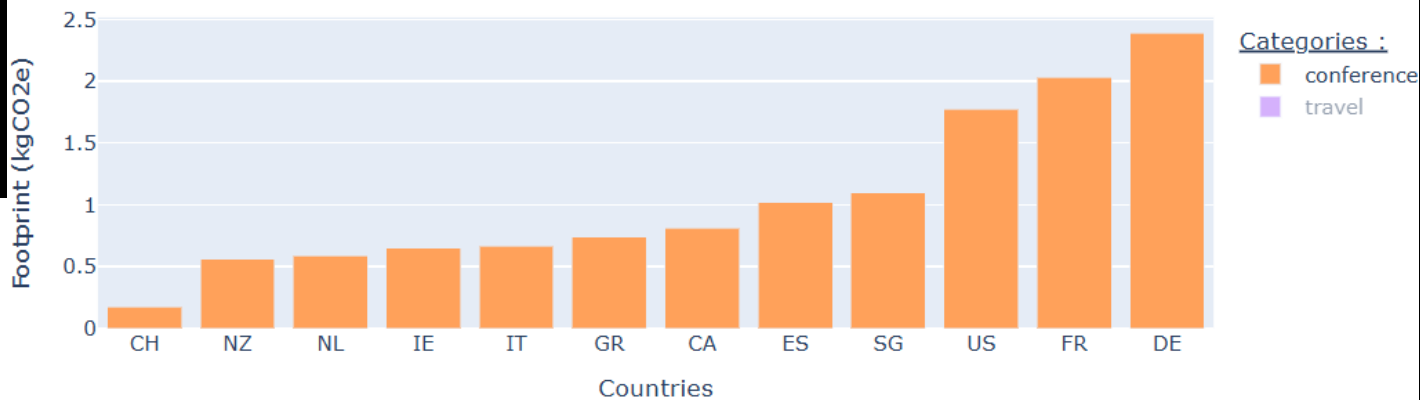
CURRENT WORKSHOP ENVIRONMENTAL FOOTPRINT

- Working efficiency
- Travel fatigue

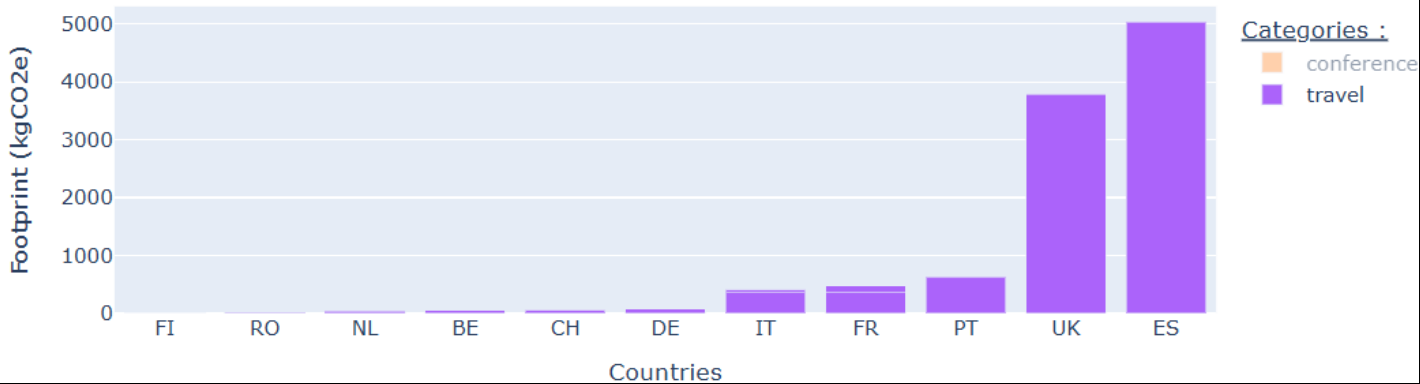
Workshop CO2 footprint by country



Workshop CO2 footprint by country



Workshop CO2 footprint by country



CONCLUSION

- Multi-hub workshop reduced considerably carbon footprint
- ES and UK share the biggest part of footprint because of the lack of hub
- Teleconference doesn't weigh next to the Travel counterpart ($\times 10^3$)
- >95% of workshop footprint due to plane usage
 - Only 15 people taking plane
 - Though plane encompasses 50% of km travelled

03

APPLICATIONS

ONE YEAR WORKING ON LISA IN FRANCE

HYPOTHESES

ONE YEAR ON LISA
IN FRANCE

- Work (time spent on laptop)
 - 50 people
 - working at 75% of their time on LISA
 - 220 days a year
 - 1 day a week working remotely
- Travel
 - Home to work travel scaled by 75%
 - Business trip according to previous model
- No tele-conference
- Computing data based on last year DCC usage
 - French mean electric mix carbon intensity
 - CNES (TREX)
 - IN2P3 (CC-IN2P3)
- Storage data based on last year
 - CNES
 - IN2P3

RESULTS

ONE YEAR ON LISA
IN FRANCE

> 55 tCO2e

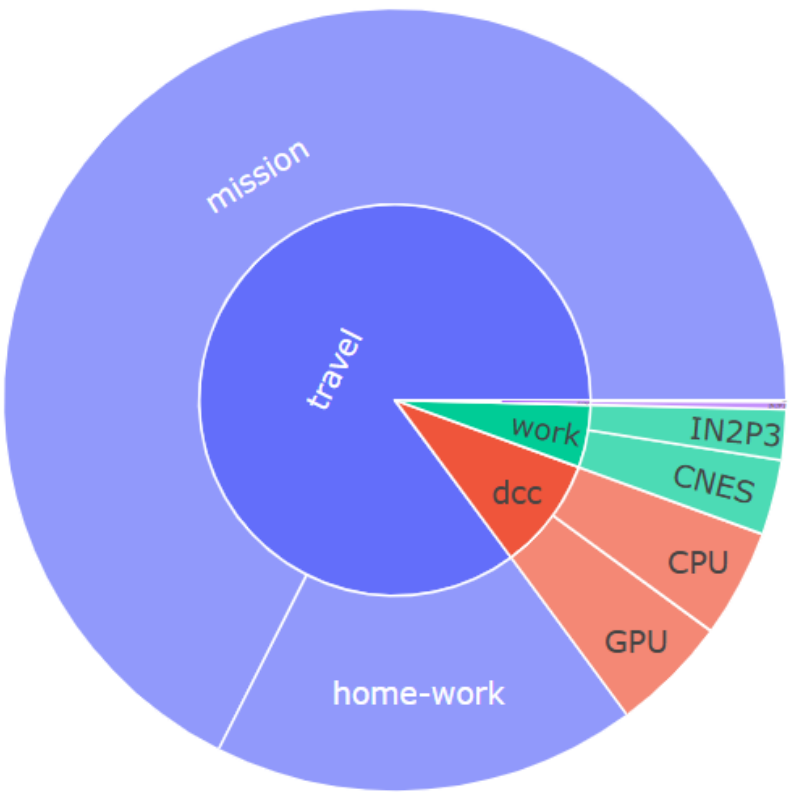
French CO2 footprint estimation of one year on LISA

mission	home-work
Footprint: 38411.00 kgCO2e	Footprint: 9974.73 kgCO2e
In category: 79.4%	In category: 20.6%
Total: 67.57%	Total: 17.55%

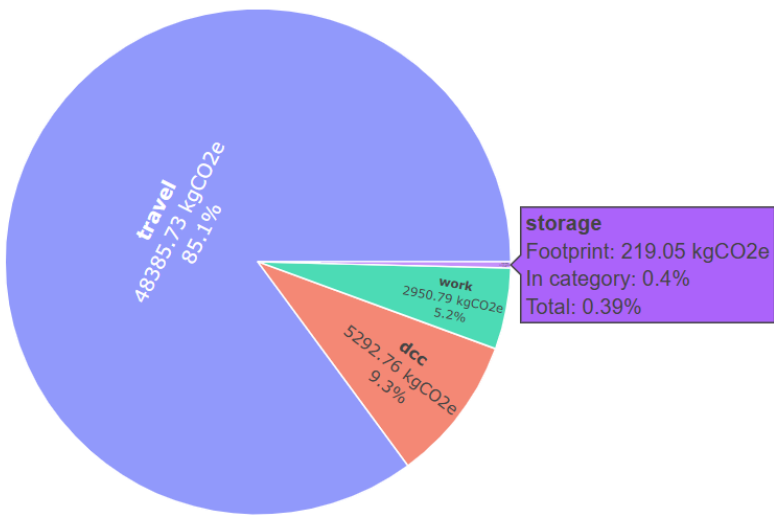
GPU	CPU
Footprint: 2756.83 kgCO2e	Footprint: 2535.93 kgCO2e
In category: 52.1%	In category: 47.9%
Total: 4.85%	Total: 4.46%

CNES	IN2P3
Footprint: 1770.48 kgCO2e	Footprint: 1180.32 kgCO2e
In category: 60.0%	In category: 40.0%
Total: 3.11%	Total: 2.08%

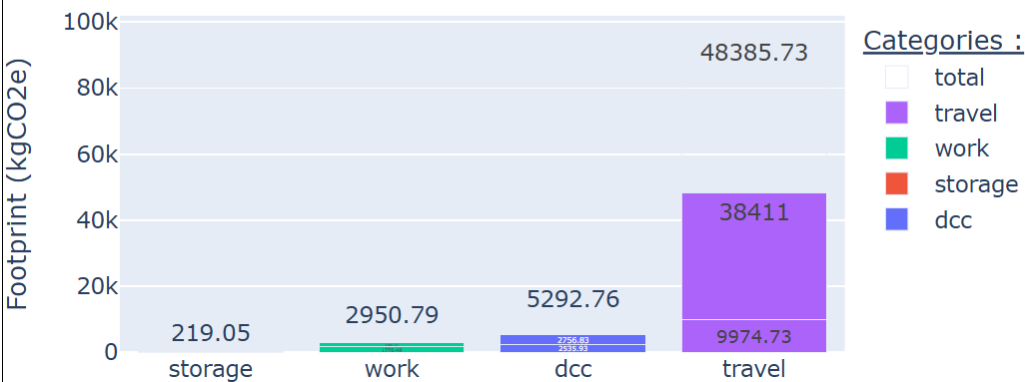
CNES	IN2P3
Footprint: 42.40 kgCO2e	Footprint: 176.66 kgCO2e
In category: 19.4%	In category: 80.6%
Total: 0.07%	Total: 0.31%



French CO2 footprint estimation of one year on LISA



French CO2 footprint estimation of one year on LISA



CONCLUSION

ONE YEAR ON LISA
IN FRANCE

- Travel : 85% global footprint
 - >65% of travel footprint due to plane
 - remaining due to car
- Computing counterpart likely to grow
 - Especially with other country members
- Storage likely to remain low
- Adding 10 countries and 20 years of development $\approx 10\,000\text{ tCO}_2\text{e}$
- Satellite launch footprint order of magn
 - Between 10 000 and 40 000 tCO₂e

04

BUSINESS TRIP MODEL



RÉPUBLIQUE
FRANÇAISE

Liberté
Égalité
Fraternité



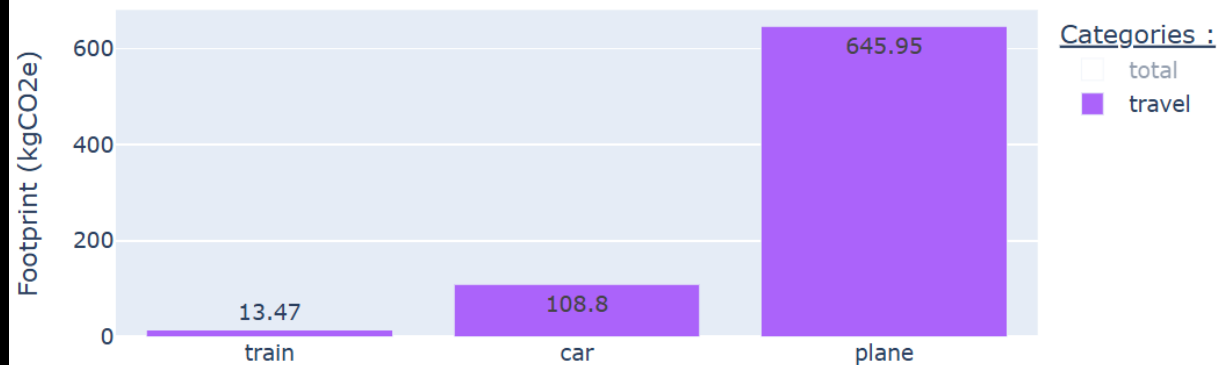
A FEW ORDERS OF MAGNITUDE

- Business trip model (round trip)
 - Plane
 - 2500 km – London/Vienna
 - Train
 - 1500 km – Toulouse/Paris
 - Car
 - 500 km – Hannover/Berlin

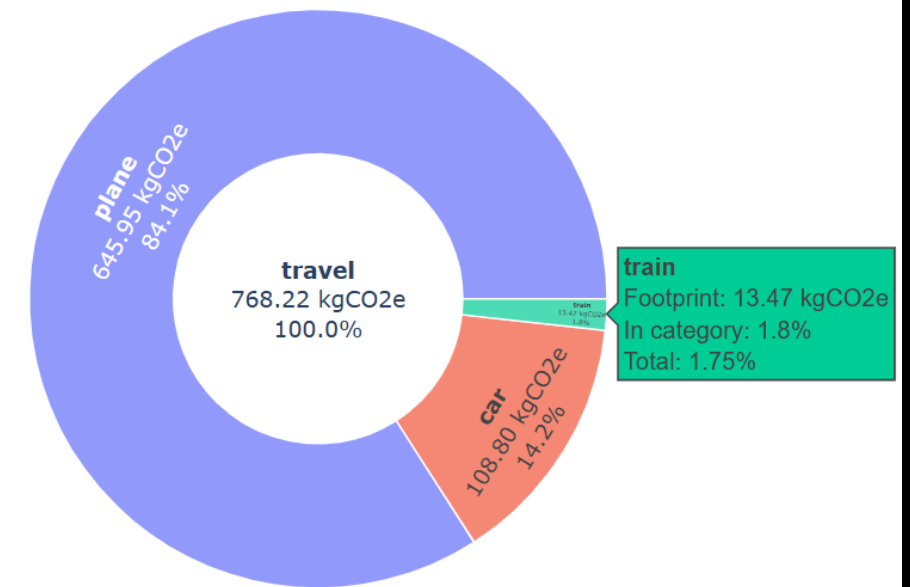
4 

30 kg 

Lambda's one year missions CO2 footprint estimation



Lambda's one year missions CO2 footprint estimation



THANK YOU FOR YOUR ATTENTION

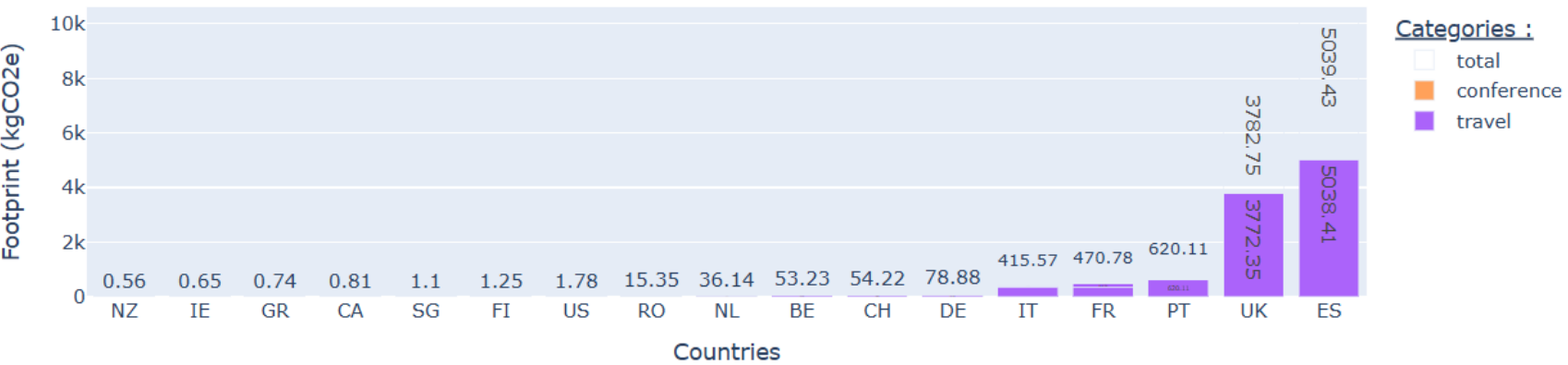
IF YOU HAVE ANY QUESTIONS, FEEL FREE TO ASK
ME!

05

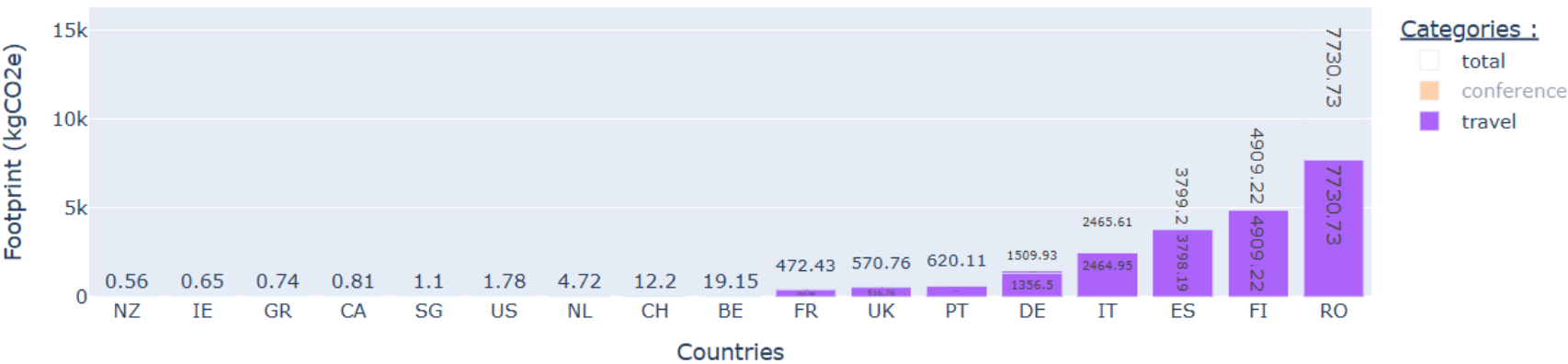
ANNEXES

MULTIPLE HUBS VS SINGLE HUB COUNTRY REPARTITION

Workshop CO2 footprint by country



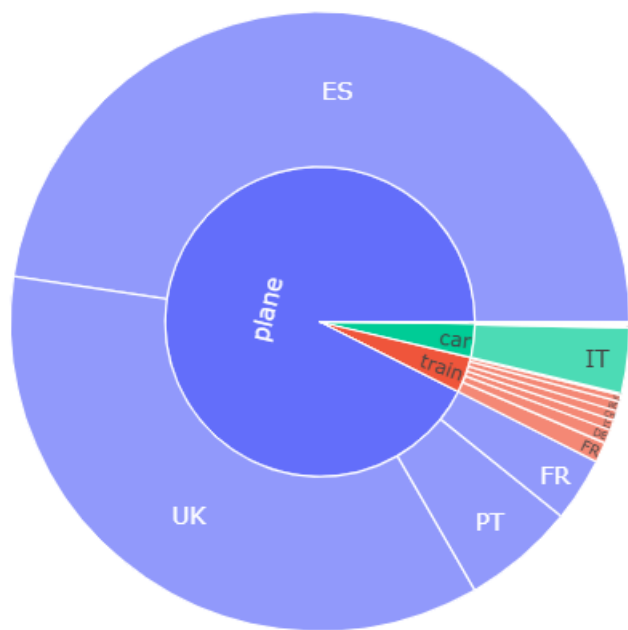
Single hub workshop in Paris CO2 footprint by country



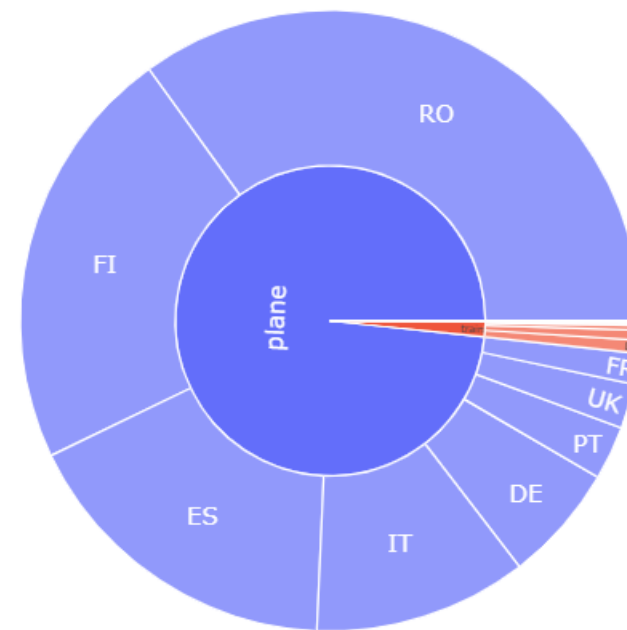
WORKSHOP FOOTPRINT COUNTRY REPARTITION BY TRANSPORTATION MEANS

ANNEXES

Workshop CO2 footprint by transportation mean



Single hub workshop in Paris CO2 footprint by transportation mean



ONE YEAR SIMULATION PROPORTIONS

